

REMARKS/ARGUMENTS

Reconsideration of this application is requested. This Amendment accompanies a Request for Continued Examination and addresses issues raised in the Final Rejection of September 16, 2009. Claims 11-17 will be pending in the application subsequent to entry of this Amendment.

Claims 11, 13 and 14 are above amended to specify a molecular weight distribution of 25 to 50 based upon the disclosure in the current claims in combination with the MWD limit of 25 in Example 4 (*see* the Table on page 11 of the specification). The upper limit of 50 of course derives from the currently pending claims.

The reason for making this change is to distinguish over the Debras prior art US 6,221,982. The Examiner maintains that the claims are “obvious” over this document and applicants have amended their molecular weight distribution range to distinguish completely over the range given in column 4, line 64 of Debras. Debras's polymers can have a molecular weight distribution of 10 to 20 and therefore cannot have a molecular weight distribution of 25 to 50.

New claims 15 – 17, dependent from claims 11, 13 and 14, respectively, specify an environmental stress cracking resistance of at least 1000 hours and are based on the description at page 6, line 4. In addition, many of the Examples have this ESCR property.

The main purpose of the claimed invention is to provide large blow moulded articles with high ESCR. That is stated as an objective of the invention on page 2 of the application as filed. This is achieved using a bimodal HDPE polymer having very specific properties. The claims are limited to large blow moulded articles only - they do not cover any other type of structure.

Debras, which the Examiner regards as the closest prior art document, concerns the manufacture of bimodal polymers in general and offers no suggestion that polymers he makes are useful for anything other than pipes. Debras therefore teaches that a polymer having a molecular weight distribution of 10 to 20 is suitable for the manufacture of a pipe. Pipes and blow moulded articles are, however, very different structures. Pipes are not blown at all.

The Examiner refers to column 1, lines 29 to 32 of Debras noting that a broadening of the molecular weight distribution (MWD) permits an improvement in the processing of polyethylene at high molecular weight. This part of the Debras disclosure is in the background section of the

patent. It concerns general comments about polymer chemistry and does not specifically relate to the polymers which Debras actually describes. Debras is observing that broad MWD improves processability. This is true but there is a corresponding trade off - broader molecular weight distribution leads to poorer mechanical properties. Note then that Debras teaches that for pipes the maximum MWD is 20. If there was no downside to increasing MWD then presumably there would be no upper limit on MWD but Debras knows that increasing MWD too much causes more problems. He teaches the skilled person not to go beyond 20 in column 4, line 64.

Debras does not teach that for blow moulded articles a polymer with a molecular weight distribution in the range of 25 to 50 is required.

One cannot just broaden molecular weight distribution to deal with the processability issue. If you have a very broad distribution you by definition have some very low molecular weight components and some very high molecular weight components. Those high molecular weight components have very high viscosity and lead actually to processability problems. There is therefore a limit above which the problems of processability resurface. What that limit might be is governed by the end use in question as pipes which are simply extruded tolerate different conditions than a blow moulded article. At no point does Debras identify that for the blow moulded articles of the present invention that the range 25 to 50 is ideal.

Debras specifically teaches that the molecular weight distribution should not go above 20. Increasing the molecular weight distribution any more may improve processability but will damage mechanical properties. For the pipe applications in Debras this is simply not acceptable as pipes have to be strong enough to withstand long term use under internal pressure etc. There is no suggestion that the molecular weight distribution can go much higher than 20 when you manufacture large blow moulded articles which require very different properties to a pipe. A pipe needs to possess long term stress resistance. Pipes will contain some kind of a fluid which will exert an internal pressure on the outside of the pipe. This is sometimes called a hoop stress and pipes need to possess good properties for this parameter. In fact, a notched pressure test is exactly what is described in Debras in column 7, line 22.

Blow moulded containers have essentially no internal pressure. What they require is good tensile strength and impact strength and those properties are improved at higher molecular weight distribution.

Debras does not consider environmental stress cracking resistance at all and does not consider whether polymers which need to be used for the manufacture of large blow moulded articles need to possess excellent ESCR. Again, pipes are not exposed to the same types of environmental conditions as a large blow moulded container so are treated very differently. Polymer companies have separate units which consider pipe applications and applications associated with blow moulding.

Debras does not teach that the very narrow MFR₂₁ range in claims 11, 13 and 14 is valuable for blow moulded article properties.

The Examiner might turn to Harlin to allege that broader MWD is obvious. Note that Harlin (as with Debras) fails to teach the manufacture of large blow moulded containers. Bottles are mentioned but bottles do not have volumes of 8L or more. The containers of the present invention are tanks not bottles. While Harlin considers lots of end uses, in particular pipes, large blow moulded articles is not one. Given that Harlin mentions pipes, films, bottles and so on this could be taken as an indication that the polymers are not suitable for application in large containers.

Note also that Harlin does not teach ESCR values of at least 1000 h at the MFR₂₁ values in claims 11, 13 and 14. It is noted in fact that Harlin, who does mention ESCR, quotes values which are much much lower for A1 and A2. Compositions where there is no B fraction such as experiments 1 and 2 exhibit ESCR values of 400 and 500 hours. In fact, the addition of the B fraction is to improve ESCR. A4 (table 2, column 7) has a higher ESCR but is achieved by increasing MFR. The claimed polymers have a lower MFR than those of A4.

Claim 14, which “consists of, as the polymer component...” the ethylene homopolymer and ethylene copolymer (as further detailed in claim 14) excludes the presence of any component corresponding to the B component of Harlin. Harlin teaches that the B component is essential and does not teach that successfully blow moulded large containers could be manufactured without this B component.

Regarding McWhorter and Suttoni, applicants know that large containers exist, the question is why adapt either Debras or Harlin to make large containers when neither tells you to do so. Barry is also not relevant as applicants are not arguing that their comonomer content is crucial.

The Debras/Harlin combination is one applicants have already considered. Applicants again question whether the skilled man would actually combine these documents at all. Debras clearly concerns pipes only. It discusses pipes in its background section and it carries out high pressure pipe tests in its Examples. Starting from Debras however the Examiner would have one go to the background section of the document and tie that background section with the polymers mentioned in Debras itself. The reader would then need to work out from the background section of Debras that the reference to blowing and extrusion in line 32 of the column 1, while then qualified by reference to the formation of polyethylene film (which are made by a blowing and extrusion process), also relates to the manufacture of blow moulded articles.

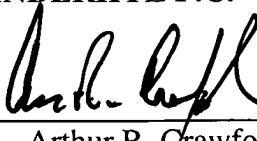
One then needs to find Harlin and import his parameters in Debras, ignoring of course that Harlin tells you to use another component as well. A tortuous path if not an improbable/impossible one.

For the above reasons it is respectfully submitted that claims 11-17 as above amended are based upon the original description of the invention, compliant with 35 USC §102, second paragraph and define subject matter that is patentable over the cited and applied prior art. Reconsideration and allowance are solicited. Should the examiner require further information, please contact the undersigned.

Respectfully submitted,

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